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SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE



July 17, 1937

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The Weekly



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DO YOU KNOW?

The earthworm has a gizzard for grinding its food.

Experiments show that some kinds of starch give strength as well as stiffness to cotton fabric.

The Scottish national zoo in Edinburgh has a butterfly enclosure, with glass front and gauze roof.

Chemical waste from corn products can be used to make an explosive more powerful than nitroglycerin.

In the East African Bantu tribe, baby boys are named by their fathers while girls are given names by their mothers.

A fish called the "desert sardine" is still found in springs in Death Valley, a survivor of the ancient time when the valley was under sea.

Banding young birds in the nest, in the hope of following their careers, may endanger their lives, if predatory animals can trail the human tracks to the nest.

Egyptian archaeologists have discovered at Hermopolis a great underground city spreading over 10 acres, where mummies of sacred ibises and monkeys were buried and the God Thoth, patron of Hermopolis, was venerated.

The milky fluid from lettuce was used as a freckle remover by Roman beauties.

Nine countries have agreed to restrict whaling to a few months of the year, to prevent whales from being hunted out of existence.

An expedition to the Canadian far north will have for one task making sound records of the love cry of that exotic bird, the Puffin.

A new official British publication is a history of British weather, starting with tradition for the year 2668 B. C. and ending with 1450 A. D.

Finding something "just as good" to feed wild animals, when their natural diet is not available, is one of the problems of zoo and circus management.

Italians, experimenting with oil from tobacco seed, report that the scent can be removed and the oil used for soaps if mixed with other ingredients, or for varnish.

Infra-red moving pictures are being experimentally taken to record what happens at seances when mediums lift distant articles or display other mysterious powers.

WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the article.

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What can Yoga contribute to American civilization? p. 46.

GEOLOGY

Oil Shortage May Hit U. S. During Next Twenty Years

Bureau of Mines Expert Foresees Increased Use of Coal and Gas For Industrial Power and Home Heating

UNLESS new methods of obtaining and processing petroleum are developed, America may begin to feel the cramping hand of an oncoming oil shortage in from 10 to 20 years. This is the verdict of Dr. Arno C. Fieldner, chief of the technologic division of the U. S. Bureau of Mines.

Dr. Fieldner, speaking as president of the American Society for Testing Materials, outlined the present resources of the nation's fuels in his address entitled, "Fuels of Today and Tomorrow."

Of coal America has plenty, said Dr. Fieldner. Enough to last hundreds and perhaps a thousand or more years. But natural gas and oil obtained by present methods may be exhausted in less than a century, he warned.

Here is the significant forecast of Dr. Fieldner on America's future fuels:

Coal will continue to be the chief fuel for the generation of public-utility and major industrial power. While improved burning of coal might tend to decrease consumption and the further development of water power may be expected to increase, Dr. Fieldner sees an increasing demand for total energy needed by the country so that coal's relative position should be favorable. Moreover, after 10 or 15 years oil resources will become more difficult to exploit, so that the trend will favor the increased consumption of coal.

Any Coal

"Tomorrow's power and central heating plants will burn any kind of coal completely and efficiently," said Dr. Fieldner. "There will be no smoke, no dust, and no sulfurous gases emitted to the atmosphere."

No substitute for metallurgical coke has appeared, continued Dr. Fieldner. The coke-oven industry should expand. Regulations prohibiting the waste of natural gas and the urge for additional markets will lead to the construction of more long-distance pipe lines which already go from Texas to Chicago and to Detroit. Gas will find industrial and domestic use and will displace oil as

well as coal for fuel in some places. As natural gas approaches exhaustion gas from coal will take its place.

Dr. Fieldner sees a further use of automatic coal and gas heating of homes and believes improved insulation will permit heating at about present costs, despite inevitable advances in the price of the fuel.

While oil-fuel Diesel engines on railroads may be expected to increase, Dr. Fieldner foresees coal retaining its predominance as the fuel for freight traffic throughout the age of oil and natural gas.

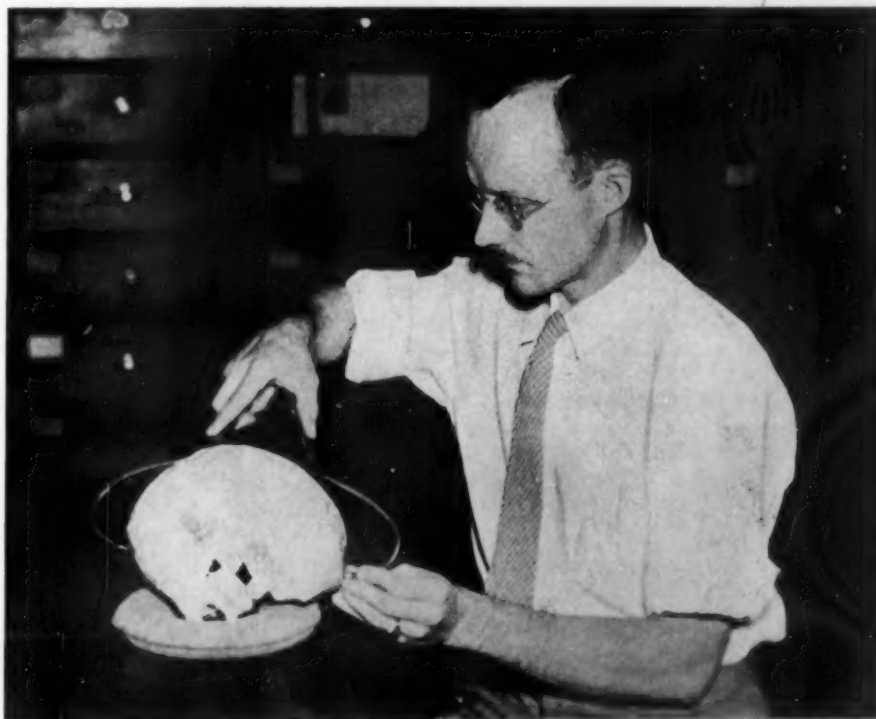
Three-fourths of the world's shipping is now powered by oil fuel. Oil, in fact,

has energized marine transport. Dr. Fieldner foresees further widening of oil as a fuel in ships and predicts that when natural petroleum sources dwindle, oil from shale or from coal may come into use.

On the crucial question of gasoline supplies for automobiles Dr. Fieldner regards present pessimistic fears of a shortage by 1945 as unjustified. Such warnings, he points out, have been issued regularly since the automobile came into use. Scientific research, both in cracking heavy oils to yield more gasoline and the reverse process of polymerization where gasoline is created out of lighter gaseous vapors, should hold the production to levels of demand, states Dr. Fieldner. Improved scientific prospecting for new reserves of petroleum and the drilling of deeper wells to tap now-unreachable sources should be a further aid for the next two decades.

Eventually, admits Dr. Fieldner, gasoline supplies will dwindle. However, improvements in engine construction to take lower-quality fuels and the expected improvements in Diesel engine operation will help materially.

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BIG HEAD

A Virginia Indian had the world's biggest known skull. He may have known Pocahontas, too—he lived at the village where she was once kidnaped. Unearthed in Stafford County, on the Potomac River, the skull is attracting interest at the Smithsonian Institution, Washington, where Dr. T. D. Stewart, anthropologist, is shown measuring it. The skull is estimated to have contained 2,200 cubic centimeters of brain, and is therefore far bigger than the 2,030 cubic centimeter brain of Russian Poet Turgenev, previous record holder. (See next page.)



DISCOVERER

Judge William J. Graham of the United States Court of Customs and Patent Appeals is shown at the Algonkian Indian village site where he found the world's largest skull. He is holding an average skull, showing that the big-headed Indian of the record skull was extraordinary among his people. Judge Graham, long interested in archaeology, has made many notable discoveries.

MEDICINE

Improved Scarlet Fever Vaccine Protects Children

AN IMPROVED scarlet fever toxin for protecting children against the disease has been developed by Dr. M. V. Veldee of the U. S. Public Health Service's National Institute of Health.

The new protective toxin, Dr. Veldee reports in the current Public Health Reports, gave immunity or resistance to the disease in more than four-fifths of the children vaccinated, as shown by change in the Dick test from positive to negative. The Dick test indicates susceptibility to the disease.

The new toxin was prepared by a method which eliminates certain objectionable features of the original material used to protect against the disease. Reactions, such as pain, muscle soreness and temporary illness, were less severe following the use of the new toxin as compared with the old. The new toxin is also absorbed more slowly, a feature which scientists believe increases the degree of resistance to the disease.

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One person in a hundred suffers from hay fever, according to one estimate.

ASTRONOMY

Peruvian Amateur Astronomer Takes Good Eclipse Pictures

SOME of the finest photographs of the sun's corona ever obtained have just been given to Harvard Observatory by an amateur Peruvian astronomer, the result of his first eclipse work.

Made during the solar eclipse of June 8 by Fernando De Romana of Arequipa, Peru, they are expected to be of considerable scientific importance in unraveling some of the mysteries of the bright solar halo, Dr. Donald H. Menzel, Harvard University astronomer, announced.

Using his own hand-operated telescope camera, with special polaroid screens sent by the University, Romana, unofficial and volunteer Harvard observer, obtained four photographs which

clearly illustrate the effects of polarization in the light of the corona. They are so accurately standardized they will enable delicate quantitative studies of coronal polarization. Romana also made four fine pictures of the sun as it appears to the human eye, unaffected by polaroid.

Harvard had decided to make no pictures of the June eclipse but Romana's request for advice resulted in the Observatory's entrusting valuable equipment to him. The negatives are especially welcome, Dr. Menzel declared, since they supplement those taken during the Harvard-Massachusetts Institute of Technology expedition to Russia last year.

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ASTRONOMY

Eclipse Astronomers Return; Find Evidence of Coronium

PRELIMINARY scientific evidence of the South Seas eclipse expedition reveals further indication of the presence in the sun of a mysterious element "coronium." This is the announcement of Dr. Irvine C. Gardner of the National Bureau of Standards and John E. Willis of the U. S. Naval Observatory, first members of the party to return.

Whether coronium is really an element unknown on earth or merely some known element existing on the sun in a form not present in the earth is one of the puzzles which the eclipse pictures of the National Geographic Society-U. S. Navy expedition may help to decide. There is some evidence already at hand that coronium is a highly-ionized form of a common earth gas which has been stripped of almost all its outer electrons.

Captain J. F. Hellweg, U. S. N., who was co-leader of the expedition with Dr. S. A. Mitchell of the University of Virginia, timed accurately the eclipse and found that Naval Observatory calculations of the first contact were within a few seconds of their actual occurrence. This newest check and correction of the

time will be extremely valuable to the Naval Observatory in its future calculations on the motions of the sun, moon and earth, which are used in determining accurate time for everyday use.

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SEISMOLOGY

July Starts Off With Two Oceanic Earthquakes

JULY started off with two oceanic earthquakes, reports the U. S. Coast and Geodetic Survey, which has computed the epicenters of the shocks from code data forwarded by Science Service.

At 6:45 a. m., EST, on July 1 seismological stations at Honolulu, Manila and Hongkong reported earth tremors on their instruments. The quake's epicenter was off the west coast of Sumatra.

Also on July 1, but at 9:37 p. m., EST, observing stations at Victoria, B. C. and Honolulu reported another earthquake whose center was in the South Pacific. Lack of further data prevents the exact fixing of the epicenter.

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MEDICINE

Better Control of Leprosy, TB May Come From Germ Studies

"Germ Fingerprinting" Reveals Danger of Putting Hands to Mouth; Snakes Subject to TB, Meeting Hears

BBETTER control over tuberculosis and leprosy, even without specific cures for these plagues, is the hope of a group of scientists who met to pool the results of their separate researches on the germs of these diseases. The problem was outlined by Dr. Esmond R. Long, of the Henry Phipps Institute, Philadelphia, at the meeting of the American Association for the Advancement of Science at Denver.

Tuberculosis in man and animals, leprosy in man and leprosy-like diseases of animals, and a cattle plague known as Johne's disease are all caused by members of the same germ family, Dr. Long pointed out. These germs are known to scientists as acid-fast bacilli because the slender rod-shaped organisms all take a red stain or dye and hold it fast even when washed with acid.

These acid-fast bacilli are alike in another important respect. No matter what part of the body or what organ they affect, they all cause the same initial reaction in the body. Their presence is the signal for the appearance of large, single-nucleus scavenger cells which gobble up the bacilli and try to destroy them. But the bacilli cause chemical changes in the scavenger cells, turning the latter into what scientists call epithelioid cells. Groups of these cells form the tubercles of tuberculosis.

Germs Make Chemicals

A chemical attack on the tb and related germs, sponsored by the National Tuberculosis Association, has shown that all of these germs, whether they cause leprosy, tuberculosis of man, tuberculosis of cattle, or other disease, produce many of the same chemicals in their tiny bodies. Each of them, in addition, produces one or two chemicals of its very own, entirely different from those produced by any other germ. Certain of these individual chemicals of the human tuberculosis bacillus can produce the same changes in the body's scavenger cells that the living bacilli produce.

Leprosy, a plague of the ages, is still

one of medicine's greatest mysteries. But G. W. McCoy, U. S. Public Health Service medical director, pronounced it "not one of our major public health questions," as it is in other parts of the world.

In most parts of the United States there is no need for the isolation of cases, in Dr. McCoy's opinion, except for charity reasons or because of the esthetic sensibilities of the community.

Dr. McCoy believes that nearly all cases of leprosy originate only in Florida, Louisiana, and Texas. But because the period between infection and development of the disease is ordinarily from five to ten years, and sometimes twenty years, the tracing of the source of infection is difficult. Only about a thousand cases of leprosy exist in the United States, half of which are known.

Dr. Ralph Hopkins of Tulane University, and dermatologist at the Carville National Leprosarium, presented evidence of a hereditary tendency to leprosy, and maintained that this justified segregation.

Hope that scientists will soon be able to transmit leprosy to some animal, in order to study the disease experimentally, was expressed by Dr. Malcolm H. Soule of the University of Michigan, who is convinced that Hansen's bacillus, first charged in 1874 with being the cause, has been grown artificially.

Dr. H. E. Hasseltine of the U. S. Public Health Service expressed the hope that science will find not only an animal that can be consistently infected experimentally, but the exact way the disease is transmitted from person to person, and a specific curative drug as effective as quinine for malaria and arsphenamine for syphilis.

Germ Fingerprinting

There is an old proverb credited to the Chinese: "You must not touch your mouth to any part of your body except your elbow."

The excellence of this advice was brought out strongly in studies reported

by Dr. Severance Burrage of the University of Colorado School of Medicine.

Dr. Burrage has made many fingerprints on plates of nutrient jelly and studied the colonies of germs that spring up after them. He finds it a most effective way of sowing bacteria broadcast.

There is a decidedly practical aspect to the studies. Public regulations make much of washing and sterilizing dishes and glasses used in public eating and drinking establishments. Then fingers pick up these nice, clean utensils—and plant germs on them.

Said Dr. Burrage: "The habit of putting the fingers to the nose and mouth is universally common. The diseases transmitted by mouth secretions are numerous, including influenza, pneumonia, common colds, measles, meningitis, trench mouth, scarlet fever, whooping cough, tuberculosis, and diphtheria. With the exception of the last two, morbidity and mortality statistics show no decrease in this group of respiratory infections. The swapping of saliva, microbial finger printing, I believe is largely responsible for this. . . ."

"While it is a difficult problem to teach everyone to cure this finger-mouthing and finger-printing habit, it is my belief that a great advance could be made by instructing employees in food handling establishments on this point; teaching them the proper ways of handling foods and utensils, as well as showing them the dangers of the improper ways."

Snakes Get TB Too

Snakes, fish, frogs, turtles, alligators and iguanas get tuberculosis as well as man and other warm-blooded animals, Dr. Joseph D. Aronson, of the University of Pennsylvania and the U. S. Office of Indian Affairs, reported. The bacillus that causes the disease in the cold-blooded animals, however, apparently cannot cause disease in warm-blooded animals. Neither can it be made into a vaccine to protect warm-blooded animals from their own type of tuberculosis, Dr. Aronson found from guinea pig investigations.

Honored

For the method of detection and treatment of radium poisoning which he developed during the past few years, Dr. Robley D. Evans of the Massachusetts Institute of Technology will receive the first Theobald Smith award in the medical sciences, of the American Association for the Advancement of Science. This award consists of a prize of one thousand dollars and a bronze medal, founded by

Eli Lilly and Company of Indianapolis, to be given annually to an eminent investigator selected by the Association.

To diagnose radium poisoning, Dr. Evans uses a sensitive radiation detector called a screen-cathode quantum counter which detects the presence of minute amounts of radium's deadly gamma rays. Treatment of the condition consists essentially of a process of rinsing out the radium-contaminated calcium and replacing it with fresh pure calcium. The

rinsing out is done by giving parathyroid gland hormone which depletes the calcium in the bones. To make them hard again, more calcium must be given in the diet or as medicine. The method depends on the fact that radium and calcium are very similar in chemical properties and consequently any radium taken into the body tends to accumulate in the same structures—the bony framework—where calcium accumulates.

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METEOROLOGY

Long Range Forecasts Unlikely to Be Attained

HOPEFUL but uninitiated people who envision long range forecasting of the weather as providing detailed information on a given day and hour and place are doomed to probable disappointment.

Hurd C. Willett of the Daniel Guggenheim Aeronautical Laboratory of the Massachusetts Institute of Technology took the "Almanac" type of forecast out of the realm of long range weather predicting at the meeting of the American Association for the Advancement of Science in Denver.

Accurate, short-range forecasts predicting local conditions can only be obtained when the full knowledge of widely distributed meteorological conditions are available both from ground stations and from aloft. This full knowledge is necessary, Mr. Willett pointed out, because the specific air masses are continually forming and disintegrating.

But, he added, "It seems rather improbable that the detailed development of [air mass] systems yet unborn can ever be forecast."

Long range forecasting, on the contrary, is based on the known fact that frequently pronounced weather abnormalities may persist over considerable areas for weeks, months and even years. The approach to the problem has been by two methods: the statistical method, using past records of weather and correlating them with an almost endless variety of variables; and the synoptic method, using synoptic charts or weather maps.

The weakness of the statistical methods, said Mr. Willett, lies in the fact that they are empirical shortcuts which have no concern at all with physical causes of the weather. Studying weather maps,

carefully prepared daily, however, furnishes a current picture of general circulation of weather over large areas. By studying this general circulation pattern it should be possible to see the influence of the pattern on contemporary weather conditions. A second aim would be to detect, if possible, empirical clues as to the future state of the weather circulation from its current state and tendencies.

For the past year, Mr. Willett indicated, meteorologists at Massachusetts Institute of Technology have been making such daily weather maps and studying them. They have found that during the colder half of the year the principal centers of weather action are the high pressure areas in Siberia and North America and the low pressure areas over Iceland and the Aleutian Islands. Important too are the subtropical high pressure areas over the Pacific and the Atlantic.

Last winter the abnormal warmth in the eastern states through December and most of January appeared due to the westward extension of the Atlantic high. Where this high met the cold mass over the continent there were heavy rains. In the Ohio Valley this led to floods.

In the West last winter's weather was marked by the abnormal disappearance of the customary Aleutian Island low pressure area and its replacement by a persistent high pressure area. This led to persistent cold air masses over the west and the usually warm mild Pacific air went north over the ocean instead of over the west coast of the United States. The western severe winter resulted.

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FAST BALL

Wesley Ferrell, crack mound ace of the Washington Senators, shows how he holds his fast ball. On the facing page, see how a pitcher's hand looks to the eye of the X-ray camera.

PSYCHOLOGY

Brain Waves Like Human's Found in the Guinea Pig

BRAIN waves, those electric impulses that are detected in the human brain itself, are probably not associated with the higher thought processes of man.

The same sort of brain rhythms have been obtained from the brain of the humble guinea pig, it is reported (*Journal of Experimental Psychology*, July), by Drs. H. H. Jasper, C. S. Bridgman, and Leonard Carmichael of The Bradley Home, Brown University and the University of Rochester.

This brain wave pattern, known to scientists as the "alpha rhythm," is not outstandingly characteristic of the electric messages ordinarily sent out by the guinea pig's brain, the investigators said, but it is possible to record from the guinea pig brain, electrical variations which in frequency, regularity and continuity, present the same nature as a good record of alpha rhythm from the human cortex.

"The findings of well-developed alpha rhythms in the guinea pig would lead one to believe that this phenomenon is connected with some basic neurological mechanism, rather than with any higher elaboration of nervous function found only in the primates," the psychologists conclude.

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ASTRONOMY

Meteor "Speedometer" Tells Velocity of Shooting Stars

Sky-Patrol Cameras Located 24 Miles Apart, Trained On the Same Point in Space, Used to Plot Their Orbits

NEW proof that many of the brightest meteors that blaze through the atmosphere are not aimless cosmic "tramps" but are in reality minute rock planets traveling, like the earth, in orbits around the sun, was reported by Dr. Fred L. Whipple, of Harvard Observatory.

A feature of Dr. Whipple's investigation, it was revealed, has been the successful use of a "meteor speedometer" in recording the terrific speeds of these shooting stars during the few seconds when they blaze out against the friction of the upper air.

The complexities of computing the meteoric orbits also required the Harvard observers to undertake the intricate task of photographing the fiery

paths of these bodies simultaneously in two widely separated telescopes.

In fifteen months of sky patrol, six of the bodies were "caught" by the two cameras, and data secured from which the distance, height, direction of motion, speed, and orbit, could be determined, Dr. Whipple said.

Computing the masses of the meteors through measures of the braking effect of the earth's atmosphere on them, as shown in his "speedometer," Dr. Whipple found that the bodies observed ranged from several pounds for the slowest meteor to an ounce for the fastest. Their speeds in the atmosphere varied from nine to fifty miles per second.

Orbital computations have been completed for five of the observed bodies,

Dr. Whipple reported. Four of these, he found, had been moving in small elliptical orbits about the sun, and were therefore members of the solar system. The fifth body had been moving in a hyperbolic orbit, indicating an origin in interstellar space outside the solar system.

The hyperbolic meteor was calculated to have a speed of twenty miles per second before it came into the sun's gravitational attraction. This speed is only slightly greater than the average speed of the stars, Dr. Whipple pointed out.

Harvard's meteor cameras were located twenty-four miles apart, one at the Cambridge station, and the other at Oak Ridge, in Harvard, Mass. The telescopes are the regular sky-patrol type in common use, and for this study were both trained at the same point in space, some fifty miles above the earth's surface.

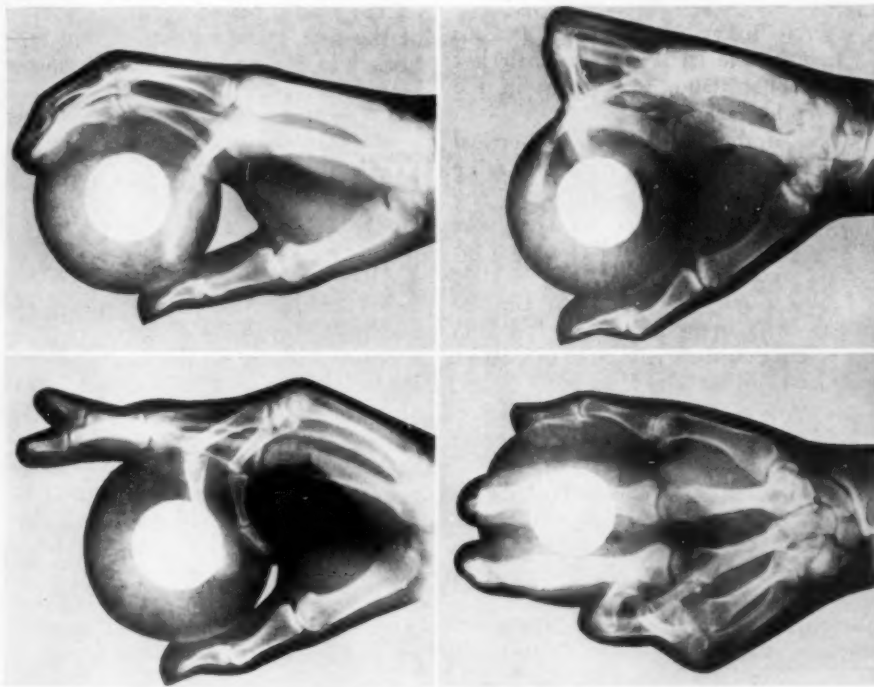
The "meteor speedometer," in the shape of an electrically operated "wind-mill camera," was attached to the Oak Ridge telescope. Main feature of this instrument is a set of fan blades revolving in front of the camera lens, interrupting the sky picture twenty times per second.

When a meteor flashed down in front of the lens, its trail was cut twenty times for every second it was visible, and measurement of the artificially produced segments in the trail provided a precise indication of velocity. Dr. Whipple said that the underlying principle of this "speedometer" has been understood for many years, but because of various difficulties involved in its use, precise results have not been obtained by this method before.

The great distance between the two observing cameras was necessary, Dr. Whipple said, to give a long enough "base" for geometric computations from the photographs of the position and movement of the bodies.

Dr. Whipple found that the midpoints of the visibility of the meteors came at altitudes ranging from forty to seventy miles. "The fastest meteors were observed at higher altitudes," he said, "which is exactly what we should expect because the greater air friction of faster moving bodies would cause them to become visible at higher altitudes where the air is rarer. The meteors photographed would have appeared brighter than Mars to the naked eye and were therefore much brighter and larger than the average."

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HERE IS HOW IT LOOKS

Top left: The X-ray camera of Miss Francis M. Davis catches the grip of a left handed pitcher for a fast ball, with a hop on it. Lower left: The change-of-pace, or slow ball, which the pitcher hopes will surprise the batter after the fast one. Top right: Grip on the famed knuckle ball that floats up to the batter without revolving and is difficult to bat for a long hit. And it's difficult to control, too. Lower right: Here's how a curved ball grip looks by X-ray. Miss Davis used a West Coast pitcher for her shadowgraph model.

MEDICINE

Stomach Ulcer Patients Need More Vitamins

VITAMINS, especially vitamin C, should be added to the diets of stomach ulcer patients, Drs. A. B. Rivers and L. A. Carlson of the Mayo Foundation advise. Patients whose ulcers have a tendency to hemorrhage should, in particular, be given extra vitamins.

The usual stomach ulcer diet is apt to lack sufficient vitamins, these physicians pointed out at a recent staff meeting of the Mayo Clinic. Finding this to be the case in a number of their patients, they gave the patients doses of vitamin C in the form of cevitamic acid. In all cases the amount of vitamin C in the blood, which had been low, returned to normal and the general condition of the patients improved markedly.

Vitamin C, found in fresh fruits and vegetables, particularly the citrus fruits, has a tendency to prevent hemorrhage, which makes it valuable in ulcer cases. Lack of this vitamin, recent research has shown, produces a disturbance in body tissues and their cells which may keep them from absorbing all the essential nutrient materials from the food eaten.

If the tissues lining the stomach are in this unhealthy state, as a result of vitamin lack, the nutrition of the body cannot help being disturbed and the stomach lining itself must have less resistance to erosion or ulceration. Giving extra amounts of the vitamin should therefore help the patient.

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CHEMISTRY

Modern Alchemy May Reveal Why Some Elements Prevail

THE MODERN alchemy of transmuting the elements from one to another by atomic bombardment is destined to solve one of the riddles of science—why the even numbered elements found on the earth are greatly more abundant than are the odd-numbered ones. More than 75 per cent. of the earth's shell is composed of oxygen and silicon, whose atomic numbers are even; 16 and 14 respectively. Aluminum, totalling 7.85 per cent., comes next and is odd-numbered, 13. But then come iron and calcium, with even numbers, 26 and 20 respectively.

Thus over 90 per cent. of the earth's crust consists of five elements alone; four of which are even in atomic number.

Lord Rutherford's new book, "The Newer Alchemy," (Macmillan) suggests the above role of modern transmutation.

Already studies of methods for changing the elements, one with another, indicates that probably in the sun the various particles are constantly changing and creating elements because of the tremendous heat and pressure. Adds Lord Rutherford:

"From a knowledge of the abundance of the elements in our earth, we are able to form a good idea of the average constitution of the sun at the time 3,000 million years ago when the earth separated from the sun. When our knowledge of transformations is more advanced, we may be able to understand the reason of the relative abundance of different elements in our earth and why, on the average, even-numbered elements are far more abundant than odd-numbered elements. We thus see how the progress of modern alchemy will not only add greatly to our knowledge of the elements, but also of their relative abundance in our universe."

Science News Letter, July 17, 1937

ETHNOLOGY

War Songs of Indians Like Those of Japanese

WAR songs of American Indians offer the latest clues to their lost ancestral homeland, somewhere in the Old World.

Pueblo Indians and Japanese warriors knew the same musical trick of raising the pitch of a war song so that it grew more exciting, Miss Frances Densmore reported to the American Association for the Advancement of Science.

Japanese got the idea from Chinese priests, who brought it from India, in the seventh century. Ancestors of Pueblos may have got the idea from some earlier, common source in the Orient, and preserved it through wanderings which ended in the Southwestern United States.

Disclaiming any intent to theorize on ancient significance of such similarities, Miss Densmore reported other Indian musical customs which she finds similar to those in the Old World.

A vocal drone, suggesting a bagpipe's monotonous holding-on to a note, is found in Indian singing in the Papago tribe near the Mexican border and the Quileute in Washington state and there is a tradition of its use by Menominee Indians in Wisconsin. This droning, Miss Densmore said, is a trait of music in some parts of European Russia and in the eastern Caucasus mountains.

Science News Letter, July 17, 1937

IN SCIENCE

ARCHAEOLOGY

Archaeological Treasures To Have Shelter

CCC BOYS are building a laboratory and storehouse for the wealth of archaeological treasures now being found on historic Jamestown Island, Va., by the projects of the National Park Service.

Case after case of relics—fragments of broken bottles, drinking goblets, plates, buttons, bolts and all the other articles which were left behind at America's first permanent English settlement—are being stored, treated for preservation, and eventual distribution to permanent museums.

The project, started in the summer of 1934, has been so fruitful that it might well last for ten more years, states J. C. Harrington, in charge of the operations.

Fifty separate sites of prior dwelling and habitation have already been found on the island, including the foundation of the first brick statehouse. An early brick kiln and two lime kilns have also been discovered.

Science News Letter, July 17, 1937

GEOLOGY

New Land Being Made By Mangrove Bushes

NEW LAND is being added, slowly but surely, to the map of the United States. The mangrove bushes along the coast of Florida are doing it, declares Prof. John H. Davis of Southwestern University. Professor Davis has been making a special study of this subject, from personal observation, examination of old maps, and comparison of newest air-survey photographs.

The red mangrove, which grows in salt water, has numerous roots which catch and hold silt and clay. As the deposit becomes higher, the red mangrove is supplanted by the white and black varieties which grow better on the higher soil. On decay, the mangrove remains form peat formations which aid further in the land-building process.

Experimental plantings of mangroves have been made along the Florida coast so that further study of their role in land-building may be investigated.

Science News Letter, July 17, 1937

NEW FIELDS

GEOLOGY

Meteorite On Ice Served To Smithsonian Institution

A STONE from the sky, found on the ice near Great Bear Lake in northern Canada, has been added to the Smithsonian Institution collection of meteorites. An Indian picked it up, wondering at its peculiar form and the fact that it was lying on top of the ice, and brought it to the nearest mission.

The meteorite is about the size of a walnut, and aside from the peculiar circumstances of its discovery is not remarkable. It is thought to be a fragment of a much larger celestial projectile now probably at the bottom of the water. Search for the parent body will be made next summer.

A second meteorite recently received by the Smithsonian Institution is the only one of its kind known to exist. It consists of the mineral known as chladnite, in a form different from that recorded for any previously known meteorite.

Science News Letter, July 17, 1937

METEOROLOGY

Upper Air Hurricane Study To Be Renewed By M. I. T.

TWO Massachusetts Institute of Technology meteorologists have started south to resume the pioneer hurricane research program started in Cuba last summer.

They are Delbar P. Keily and Douglass S. Mackiernan, Jr., both of whom were in the tropics last year for preliminary studies of violent meteorological conditions. An unusual scarcity of storms in the Caribbean prevented the desired observations but the hurricane hunters hope for better luck this year.

The major portion of the research will be conducted with latest type radio meteorographs, flying balloon radio stations which broadcast pressure, temperature and humidity data from the upper atmosphere. Science has but scant information on these conditions.

When a hurricane is approaching, such information is needed quickly for weather forecasting.

Keily and Mackiernan will operate from Havana but Technology is also equipping another station in Raleigh, N. C., under the direction of Christian Harmantas to obtain correlated data. Weather experts of the Cuban and United States governments are cooperating.

The balloons are expected to reach altitudes of from ten to fifteen miles before they burst and drop the shock-proofed instruments to earth. Each will carry an identification tag offering a reward for return to Technology, a system proved very successful in previous studies in other parts of the country.

Science News Letter, July 17, 1937

ANTHROPOLOGY

Tallest Blond Communities Studied in North Germany

TALLEST blond communities in the world, is the distinction claimed for three isolated villages in a marshland district near Bremen. Nevertheless, they are not classified as pure Nordics by Dr. Christian von Krogh of the Munich Anthropological Museum, who has just completed a special study of them. He calls them "Nordic-Falians"—by analogy perhaps with the tall, medium-blond, but rather round-headed Westphalians.

This group of people are landholding peasants, and they have held the same land for centuries. Two of the villages, Arsten and Habenhausen, have been in existence since prehistoric times; the third is comparatively new, having been founded in the eleventh century on land that had just been drained. Its name, Neuenland, Englishes as "Newland."

The farmer families marry only among themselves, keeping the landless workingmen of the towns excluded from their family circles. A considerable degree of inbreeding has naturally resulted. Tracing family trees back four generations, Dr. von Krogh found only 69.4 per cent. as many ancestors as there would have been had no intermarrying occurred.

That inbreeding to this degree has not harmed the stock physically is evidenced by the condition of the people today. The average body height is five feet nine inches; it is the greatest group height known in Europe. The people have big heads—high, long, and wide—with large faces to match.

Gentlemen of the community just about have to prefer blondes, unless they prefer to remain bachelors. Prevailing hair color is dusky blond, and over four-fifths of the population have blue eyes.

Science News Letter, July 17, 1937

PHYSICS

New Principle of Nature About to be Discovered?

EITHER astronomers are soon to discover some new, hitherto unrecognized principle of nature or else telescopes like the 100-inch diameter instrument of Mt. Wilson Observatory are now looking about to the limits of the universe.

This is the choice which Dr. Edwin Hubble, Mt. Wilson Observatory's noted astronomer, extends to his fellow scientists. As soon as the new 200-inch telescope being erected on Mt. Palomar, California, is in operation and studies on the light from the most distant nebulae are made with it, astronomy may have the answer to its present quandary.

The trouble is with the present theory of the expanding universe which accounts nicely for the shifting of the light from distant nebulae toward the red end of the spectrum. The expanding universe theory, one recalls, pictures some tremendous explosion in ages past which sent out matter that is still expanding. Just as the whistle of a train goes to a lower pitch as it rushes away from the observer so too, in the optical case, does the light from a nebula rushing away from the observer go to a lower "pitch," which, in the case of light means a shift toward the red end of the spectrum. The trouble with this interpretation of the "red-shift" is that it leaves one with a universe that is small, closed and dense; a universe whose outer limit is but little more than the present seeing limits of existing telescopes.

Frankly astronomers admit that they have yet no alternative theory which fits the observed facts so satisfactorily but many of them cannot help feeling that they are not now looking to the limits of space or anywhere near it and that the present region they observe is probably only a small part of a far vaster space.

Alternative solution is to avoid calling the "red-shift" evidence of an expanding universe and to visualize one that is static and far vaster in both age and volume. But before that can be done some scientist will have to discover, recognize and interpret the new principle of nature. Like a careful mountain climber, scientists do not jump off a time-tried, safe ledge of knowledge until they have a better one.

Science News Letter, July 17, 1937

AGRICULTURE

Tung Trees in America

Introduced Here 30 Years Ago, Rapid-Growing Trees From the Orient Gain Root-Hold in the South

By DR. FRANK THONE

See Front Cover

BIRNAM WOOD came to Dunsinane Hill, Shakespeare tells us. It came in the form of branches cut down and carried by the soldiers of MacDuff—one of the first recorded uses of camouflage, and probably the only time that trees took marching orders from a general.

But trees have taken marching orders from agriculture and industry for many ages. The trails of their migrations criss-cross the map of the world. Every orchard you see is a regiment of trees that has marched into our land from somewhere afar: apples and pears from central Europe and interior Asia, cherries and peaches from Persia or China, all the citrus fruits from some rather vaguely determined region on the Road to Mandalay.

From our own New World, too, trees have gone a-marching: Para rubber from Brazil to Indonesia, quinine-yielding cinchona from the Andes to the uplands of the same British and Netherlands colonies, cacao from the Orinoco country to Africa. These beneficent invasions and counter-invasions by trees have been going on since the gray dawn of civilization, and they are going on still.

New Recruits

Newest recruits to these tree armies of agriculture and commerce are the tung trees of China. Their forces are now in the neighborhood of the four-million mark and increasing every year. They are entrenched all along the Gulf coast from eastern Texas to northern Florida, across the peninsula as far south as Tampa Bay, and on to the sea on the southeastern coast of Georgia. A hundred miles wide is the territory considered suitable for tung tree occupation along the Gulf, with a block at least three times that deep in northern and central peninsular Florida.

All this, where five years ago the total number of trees hardly reached the half-million mark.

Why this astonishing recruitment-rate, among trees that are still hardly even a name to most of us?

Not hard to answer. Though we may

know little or nothing of the tung tree, that does not prevent us from contact with its product every day of our lives. Tung oil enters into the paint and varnish on our walls and floors, the synthetic plastics in our toothbrush handles and radio-set fittings, the linoleum on the kitchen floor and the oilcloth on the pantry shelves, and even into the ink in the printed advertising matter that makes us want to buy all these things. Tung oil is an important ingredient in the industrial complex of American life, and was important even before tung trees first made their landing on American shores.

Tung oil comes from the seeds of the tree that bears its name. Each fruit of the tung tree is an object the size of a small apple, that looks something like a black walnut with the hull still on it and something like an unsuccessful tomato. Each fruit contains five large, oil-rich seeds.

Heart

The leaves of the tree are large and heart-shaped. The Chinese word for heart is "tung." So tung became the name of the oil, and the seeds, and the tree itself.

For many centuries the Chinese had been using tung oil, obtained by crude methods of extraction, for calking and painting their boats, treating leather, waterproofing paper and cloth. A few early travelers and missionaries brought out small quantities of the oil and told of its use. But it was not until well into the nineteenth century that American and European manufacturers really began to make large use of tung oil.

The world's supply of tung oil still comes almost altogether from China. Hankow, on the Yangtse river, is the principal port, though considerable quantities also start from Shanghai, Canton, and Hongkong. The exports in 1936 from Hankow alone amounted to nearly 80,000 tons, of which the United States absorbed about three-fourths and the whole of Europe the rest. Since the whole of the American-grown tung oil production last year amounted to only 1,000 tons, the extent to which we are

dependent on China is startlingly apparent.

The little tung oil that we have been able to put on the market so far is eagerly licked up to the last drop as fast as it is offered. With better machinery and methods, American tung oil producers are able to obtain a transparent, honey-clear oil, while the oil imported from China is turbid and dark as molasses, and contains considerably more free acid than the American product—a decided technical disadvantage. Besides, a good many of the canny Chinese have no scruples over turning a somewhat dishonest penny by adulterating their tung oil with cheaper oils, such as soybean oil and peanut oil.

Held Down

The result of the unsatisfactory quality and lack of uniformity in the imported tung oil has been to discourage its use in American industrial plants. One manufacturer told a representative of the U. S. Department of Commerce, "We hold tung oil down to the absolute necessary minimum in our formulae, and get along on about one tank car load a week; but if we could be sure of a steady supply of American-produced oil we would step up our



TUNG FRUITS

One is sliced across to show the seeds, or nuts, and two of the nuts, taken out.



LOVELY

A tung tree in full bloom can hold its own in a beauty contest with apple, peach, cherry or any other orchard tree you might wish to name.

tung-oil purchases to seven carloads a week."

The supply of American tung oil should increase rapidly from the plantings already in the ground, not counting the thousands of acres that are being added every year now. This is because the great majority of the trees are still young, so that their yield per individual tree will go up fast during the next few years. The bearing habit of the tung tree seems to resemble that of an apple tree. It will produce a small crop of fruit by the time it is five years old, but does not reach maximum productivity until it is about twenty. After that its bearing life may be long—how long, nobody knows as yet, for the oldest trees in this country were set out only about thirty years ago.

Quick Production

The quick and abundant production of tung trees, and the rapid extension of their territory during the past few years, are likely to set traps for the enthusiastic but unwary investor. Already there has sprung up a pestilent crop of "blue-sky" promoters, who are inducing poor folk to entrust them with the care of tung orchards in the South which they will (they hope) make their "Shangri La" when they grow old. It is an old racket, and has been worked in citrus, pecan, and a number of other lines—

always to the detriment of honest business and of the South in general. Legitimate tung planters and related businessmen and bankers boil over whenever this subject is mentioned, but they can do little about it, for this jackal fringe manages to stay within the letter of the law.

Do It Yourself

All that can be done is to emphasize over and over that if you expect to make money out of tung oil you must live among your trees and take care of them yourself. Applicable here is the maxim that Benjamin Franklin wrote long ago, for Poor Richard's Almanack: "He that by the plough would thrive,

Himself must either hold or drive."

It is probable that the bulk of American tung oil will be produced on large plantations, perhaps owned by corporations or cooperative societies. Yet there is ample opportunity for the small landowner to tend a few trees planted on land not suited for field cultivation, and thus be able to pick up a neat bit of cash each year when the fruits ripen.

Unless new and hardy varieties of tung trees can be produced by breeding, it is not likely that orchards will be planted for profit outside the present rather restricted limits. Experience has shown that the trees have certain rather

"fussy" requirements as to soil and climate.

They are deciduous, shedding their leaves in autumn and standing bare and dormant during the winter; for this reason they thrive best where there is at least a short cool season with a suggestion of frost. Yet they cannot stand more than just a little frost. An ordinary freeze will kill their buds, and a severe freeze makes an end of the trees outright. So both southern and northern limits are rather severely set by climate.

Critical

Their water requirements are almost as critical. They will not thrive on less than thirty inches of rain a year, and they do better on the forty-plus rainfall of the eastern Gulf coast and northern Florida. Moreover, they want well-drained soil; rolling land with deep, porous surface soil giving good down-drainage as well as free run-off is best.

Finally, they will not tolerate the least degree of alkalinity. They rebel at even a neutral soil, but smile and thank you if you plant them in acid land. Fortunately, in the cutover pinelands of the Gulf coast, acid soil is "what they ain't got nothin' else but." However, there are places where a limestone sub-soil comes close to the surface, and where tung-oil trees were injudiciously set out on such land they invariably died off.

Tung trees will bring more than wealth to the South. When they are in blossom they are objects of breath-taking beauty—flowering trees that will make even the orange groves of Florida and the peach orchards of Georgia look well to their honors. Their flowers are bell-shaped with a slightly flaring rim, marked with pink or deep yellow in the throat, and are borne in close clusters. They come before the leaves so that a tung tree in bloom looks like a single giant bouquet.

Ornamental

Planted far enough apart to give each tree chance to develop its full size, they are splendid things to see when they are covered with their dense crown of dark-green, heart-shaped leaves. A really large tung tree will become almost spherical, forty feet high and as much in spread. They can be ornaments for lawn or park as well as work-trees in orchards.

The tung-oil of the South is expected to form a vital link with the farming-for-industry movement in the North,

through another oil plant that also came from China, the soy bean. Soy bean oil is now being produced in considerable quantities, with the principal center in Illinois and neighboring Corn Belt states. The oil is in considerable demand for food uses and in the manufacture of soap, but its greatest potential market is as a paint ingredient.

Used alone in paint, soy bean oil is that thing anathema to all good painters, a slow drier. But if the proper proportion of heat-treated tung oil is added, the performance of the paint is very greatly improved. American production of soy bean oil is away out in front at present; it is up to tung oil to catch up.

America is not the only country where tung trees are being cultivated. In the warmer lands of the vast British Empire—India, South Africa, Australia, the Pacific islands—large-scale experiments are going on. Argentina, Paraguay and Brazil are among the potential tung-oil countries in South America. And latterly the Soviet Union has had delegations of experts visiting our plantings in the South, with a view to setting out trees in the warmer lands of interior Asia.

Tung oil, it would appear, is about to step out.

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Science News Letter, July 17, 1937

EDUCATION

Deafness Is Handicap In Learning To Write

DEAFNESS, known to be an almost insuperable obstacle to the learning of speech, now appears also to be a handicap in learning how to write good English. At the meeting of the American Association for the Advancement of Science, Prof. William H. Thompson of the University of Omaha reported a study of 16,000 school assignments by 800 deaf children, which lend strong support to this thesis.

Of the children studied, 47 per cent. were born deaf, 21 per cent. became deaf before the age of five years, and 32 per cent. after five. All the children had more difficulty in learning written English composition than normal children would have had. Children who had once been able to hear averaged better than those born deaf. The errors of those who lost their hearing after the age of five closely resemble the errors of normal public school children.

Science News Letter, July 17, 1937

BOTANY

Arctic Botanist Gathers Poppies Through Snowbanks

Pere Arthème Dutilly Does His Botanizing During The Long Cool Days of the Arctic Summer

FAR in the northernmost Canadian lands, where the cold polar sea laps coasts that are mostly sullen and inhospitable, the long day of the Arctic has brought spring at last. In the thin layer of soil that thaws above the ever-frozen level at a few inches beneath, flowers are beginning to bloom—delicate harebell, bold dandelion, Indian paintbrush that is a brawl of color, flaming Arctic poppy, and a whole constellation of others.

To this, his high-latitude botanic garden, now returns the Botanist of the Arctic, Pere Arthème Dutilly, of the Oblate Missions. He has been away from his Arctic for a winter and spring, while he worked up his collections and notes in the laboratories of the Catholic University of America in Washington, D. C. Now he is buckling up his last straps, and in a few days will be on a small steamer nosing its way along Labrador's forbidding face.

This summer he will botanize the region around the northern end of Hudson Bay. It is familiar territory; he has been there before. Pere Dutilly's botanizing trips have taken him along all the Arctic coasts of Canada: around Labrador, in Baffin Land, on the Keewatin Peninsula, across the long coast of the Northwest Territories, up the Mackenzie and Slave rivers. He has plucked Arctic poppies growing through the snow at Latitude 76 North on Ellsmere Island, and pulled up trees by the roots alongside the Alaskan boundary.

(That latter feat, by the way, was no Paul Bunyan exploit; the birch and willow trees of the Arctic coast never grow more than six inches high.)

Four years Pere Dutilly spent in the Arctic before he "came out" to where he could get at library and laboratory facilities, arrange his specimens and send them to the herbaria that are to house them, and get the Eskimo kinks out of his tongue with a little French and English conversation. He will come back again next fall, for he still has a lot of work to do in Washington.

He expects to write a book on the

plant ecology of the Arctic—ecology tells not merely what plants, but how they get along with the climate and their relations one to another. He has seen some interesting things that still await telling.

For example, there is the matter of foliage color. Arctic plants tend to be purple instead of green. The higher the latitude the deeper the color. Pere Dutilly can tell, from looking at another man's specimens, about how far north they grew. His rule might be summed up: "The norther, the purpler."

Plants, however, are not the whole of Pere Dutilly's interest. After all, he is a missionary, and a human being too. He loves his Arctic and the Eskimos among



SUMMER GARB

Pere Arthème Dutilly showing what the well-dressed young botanist should wear this summer when he goes flower seeking in the late Arctic afternoon (about 11 p. m. and still daylight).

MEDICINE

Great Advance Noted in Struggle Against Cancer

Death Rate Among Older People Is Increasing But Disease Is Not Killing More of Those Under 70



GROWING IN SNOW

An Arctic poppy, one of those gathered by Pere Dutilly when he goes botanizing in the icy north.

whom he and his 60 fellow Oblates work. They live on even terms with them: even his superior, Bishop Pierre Fallaize, emulates his Galilean namesake and catches fish for his own eating. Sometimes fish is all the Bishop of the Arctic has for dinner.

Eskimo health, Pere Dutilly reports, is being badly undermined by the kerosene stoves which the traders have introduced. The stoves overheat the snow igloos in winter, changing the walls to ice which lets the heat escape. The traders cannot be induced to stop selling stoves and kerosene because they make money that way, so the missionaries are showing the Eskimos how to set up their summer tents of skin inside the igloos and thus prevent at least part of the damage to the snow walls.

Pere Dutilly applies in Eskimoland the old adage, "Love me, love my dog." Fond as he is of the Eskimo, just so fond is he of the "husky." The big sledge-pulling dog he calls "horse of the North." Along the middle shores of Hudson Bay, where it is far enough south to do a little gardening, he has seen dog teams pulling a plow in summer, and in winter dragging logs out of the timber.

Science News Letter, July 17, 1937

Limes are more acid than lemons.

Crosses between radishes and cabbages have been made in scientific experiments.

A "GREAT advance in the struggle against cancer" was reported by Dr. W. Cramer, of the Imperial Cancer Research Fund, London, to *The American Journal of Cancer*.

This is the fact that the increase in cancer during the last 20 years, in England at least, is almost all in the age groups over 65 years. This is true for cancer of the organs most frequently attacked by cancer, such as the tongue, esophagus, stomach, intestines, liver and pancreas in men, and the uterus in women. The only exception is in the case of breast cancer in women. Here there is a significant increase even in the earlier age groups.

"To the average person and his relatives," Dr. Cramer points out in reporting this encouraging advance in the fight against cancer, "the question of importance is not whether he dies from cancer or some other disease, but at what age he dies from any disease whatever."

The increase in cancer mortality is not so frightening when it is realized that cancer is not killing any more people before they have approached the Biblical span of life than it did 20 years ago.

Dr. Cramer also pointed out that a new chapter in cancer research has opened with the discovery that breast cancer can be produced in mice by injecting female sex hormones under the animals' skin.

This means that cancer can be caused by a substance normally present and active in every person's own body. (A certain amount of female sex hormone is present in a man's body as well as a woman's, recent research has shown.) Common sense, of course, will prevent any alarm over the fact that a person is carrying a powerful cancer-causing substance in his own body, because while everyone has some of this hormone, not everyone develops cancer.

The discovery that female hormones can play a part in cancer causation does not give the solution of the cancer problem but it may start scientists on the right road to that solution by enlarging their outlook on the problem.

Scientists heretofore have believed that cancer resulted from a combination of internal and external factors. The internal factor is a special susceptibility, probably inherited. The external factor is something outside the body that irritates until cancer develops. This could be radium, which causes skin cancer on prolonged exposure; parasites (germs in common parlance) which get into intestines or liver and set up cancer-producing irritation; or chemicals such as coal tar, cause of "chimney sweeps' cancer."

Now, Dr. Cramer says, scientists have evidence for the existence of a cancer-causing environment which is entirely within the body. This not only gives them a new direction for research but explains among other things why cancer can develop in organs not exposed to influences coming from without the body.

Science News Letter, July 17, 1937



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PHYSIOLOGY

Locate Cells That Produce Anti-Blood-Clotting Heparin

HEPARIN, a substance of sugary nature that can keep blood from clotting, is produced by a special kind of body cells called mastcells, Dr. Hjalmar Holmgren of the Caroline Institute, Stockholm, reports.

Because heparin can retard or check the coagulation of blood, it is much used in experimental work and scientists hope that it will prove practically useful in cases where it is desirable to prevent blood clotting, such as transfusions, and to prevent dangerous blood clots that sometimes occur after operations. It is most easily obtained from the liver and was originally discovered by Dr. William H. Howell of Johns Hopkins University.

The mastcells which Dr. Holmgren

believes to be producers of heparin were discovered in 1876 by Paul Ehrlich, the German scientist who developed the drug that cures syphilis. They have been studied by a number of scientists since then but their function has not until now been known.

Mastcells are found in great quantities in the liver and the veins. These cells have the same reactions as heparin when submitted to metachromatic staining (with toluidinblue). Dr. Holmgren has studied the proportion between mastcells and heparin in organisms, and found that the proportion is direct, so that in an organism with few or no mastcells there is only a little heparin or a total lack of it.

Science News Letter, July 17, 1937

PHYSICS

New Heavy Atomic Particle Was Predicted by Japanese

THE NEW heavy electron, weighing about fifty times as much as the ordinary kind, was predicted by the Japanese scientist H. Yukawa as early as 1934, it is disclosed. (*Physical Review*)

Prof. E. C. G. Stueckelberg of the Institut de Physique, Geneva, Switzerland, reports that both he and scientist Yukawa independently arrived at an explanation of the forces within the atom

which predicts such a heavy electron as is now exciting the research physicists. Drs. J. C. Street and E. C. Stevenson of Harvard University, and Nobelist Dr. Carl Anderson and Dr. Seth H. Neddermeyer of California Institute of Technology form two research teams that have found indications of the heavy electron.

The heavy electron, states Prof. Stueck-

elberg, is predicted by equations which describe matter by a mathematical operator known as a spinor, having 16 components or parts. Four components refer to the electron state of the atom, four more to the neutrino state of the atom, another four to the proton state and the last four components to the neutron state of matter.

According to Prof. Stueckelberg's theory the new-found heavy electron is very unstable and can only be of secondary origin created out of some of the particles now known. Four other particles, yet undiscovered, are also predicted by the theory, states the Swiss scientist.

Science News Letter, July 17, 1937

PSYCHOLOGY

American-Trained Scientist Studies Yoga For Year

A MEANS for attaining a "radiant personality," and for tapping the hidden reserves of mental and emotional power that lie in the ordinary individual's personality is the contribution that the Yogic practices of the East can bring to the Western World.

This appears to be the promise of a new scientific appraisal of these ancient teachings of India under the auspices of Yale University's Institute of Human Relations by Dr. Kovoort T. Behanan.

Living for a year as a student disciple of Swami Kavalayananda, of Lonavla, India, Dr. Behanan learned the peculiar exercises of the Yogic discipline, which include controlled breathing so as to increase oxygen consumption and special tricks of concentration that in some ways resemble self-hypnotism. He then returned to the laboratory at Yale and subjected what he had learned to scientific scrutiny and appraisal.

Tearing away the veil of superstition and ignorance that have for so long kept the Western World in the dark concerning Yoga, Dr. Behanan has exploded many popular misconceptions about it.

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cussions over the Columbia Broadcasting
System.

Yogic breathing and concentration both have an effect on the mental processes during the time that they are being practiced, he found—the breathing having more effect than the concentration. The changes in oxygen consumption, he believes to be the clue to this effect. Mental efficiency is reduced, during this controlled breathing in much the same way that it is during relaxation.

But a more profound and lasting effect on the general personality was also observed by Dr. Behanan.

"The systematized practices of Yoga seem somehow to be able to arouse little by little as the practice progresses, this indomitable power of the human mind," he reports in his new book "Yoga" (Macmillan).

"I have had the privilege of watching at close range the daily lives of more than a half-dozen Yogins for over a period of one year. I can testify without any reservation that they were the happiest personalities that I have ever known. Their serenity was contagious and in their presence I felt always that I was dealing with people who held great 'power' in reserve. If the saying 'radiant personality' means anything, it should be applied to them."

Dr. Behanan does not ask for "converts," it is pointed out by Dr. Walter R. Miles, Yale psychologist, in a foreword to the book.

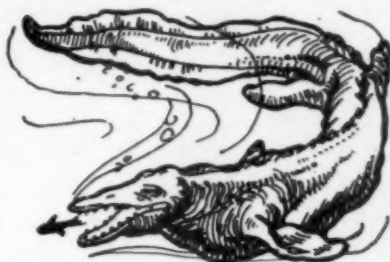
"The author of the present volume does not press the reader to accept or to reject the Yogic system," said Dr. Miles. "He is neither over-protective and over-zealous on the one hand, nor is he coldly destructive in his analysis."

Science News Letter, July 17, 1937

A one-piece steel automobile top can be formed in one operation at the rate of 90 tops per hour.

More than 1,000 cities in the United States have adopted ways of testing city water to remove undesirable tastes and odors.

PALEONTOLOGY NATURE RAMBLINGS by Frank Thorne



Real Sea Serpents

SEA-SERPENT season is still with us. It's a poor beach resort (or one with a poor press agent) that can't scare up some kind of a mysterious monster, to scare bathers out of the water—temporarily—and to coax out a little extra business as the season grows late.

Sea serpents are explained in a half-a-dozen ways, from floating logs indistinctly seen through choppy waves, to schools of porpoises, basking sharks, and (in deep-water yarns) the occasional giant squid that comes up from the depths waving his forty-foot arms. And some of them are just plain imagination, aided perhaps by suitable glasses, frequently filled—and emptied.

It is characteristic of this age that prides itself on being skeptical and scientific (however readily it yields in a pinch to age-old credulities) that rationalistic explanations are sought even for sea-serpents. Former ages were not so fussy: in medieval and early modern times, when less was known about the world, imagination had a much better chance. Thus, Bishop Olaus Magnus of Upsala, not long after America was discovered, could write about a 200-foot man-eating sea-serpent, and get away with it.

It is a pity that the worthy Bishop did not live in really ancient times—say a hundred million years ago. There were creatures in the sea then that absolutely met all the specifications for the most awesome kind of sea serpents. In the seas of the Cretaceous geological period swam a group of reptiles with serpentine bodies forty feet long or more, gaping jaws armed with rows of ferocious teeth, surely able to gulp down any unlucky sailor—if there had been sailors in those remote pre-Noachian days.

They were the mosasaurs—"lizards of

the Meuse," is what the name means, because the first skeleton of one of these giant beasts was found on the banks of the pleasant French river whose ancient Latin name is Mosa.

Mosasaurs lived in the last days of glory of the dinosaurs, but despite their formidable size and undoubtedly ferocious habits they were not dinosaurs. They were members of the same family that includes modern lizards and snakes, and hence fairly entitled to be called real sea serpents.

Science News Letter, July 17, 1937

ENTOMOLOGY

Gnats Survive Tomb Of Snow in Mountains

GNATS entombed in snow but still alive were discovered by a snow-gauging patrol in Yosemite's High Sierra, reports Long Garrison, one of the rangers on the patrol. Dipping up a pail of snow to melt for drinking water, the ranger discovered the insects, resembling mosquitoes. They crawled very slowly until warmed. A few of the insects were put in a match box for preservation. When the box was opened to add additional specimens, those first put in had warmed sufficiently to fly away.

Science News Letter, July 17, 1937

GEOLOGY

Visiting Geologists to See Huge Scientific Map of USSR

GEOLOGISTS who will gather in Moscow late this summer for the International Geological Congress will be able to see in advance what kind of territory they will traverse on the various geological field trips that will follow the meeting. A huge map, 32 square meters (345 square feet) in extent has been prepared as one of the exhibits at the Congress. It shows all geological formations that have thus far been mapped in the USSR, states Tass.

Science News Letter, July 17, 1937

A Japanese company will manufacture artificial indigo.

SEASICKNESS

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Current Events

THE NEW INTERNATIONAL YEAR BOOK: A COMPENDIUM OF THE WORLD'S PROGRESS FOR THE YEAR 1936—Frank H. Vizetelly, ed.—*Funk & Wagnalls*, 802 p., illus., cloth \$6.25; red buckram, \$7.25; half leather \$9; full leather \$11.50. The state of the world as of Dec. 31, 1936; war in Spain, the Soviet "purge," Edward's abdication, rearmament, new things in literature and the arts, the Olympics—all significant human activities compacted into close chronicle and comment. As a compendium of history that has hardly had time to "set," these Yearbooks are really remarkable things.

Science News Letter, July 17, 1937

Physics

ATOMIC SPECTRA AND ATOMIC STRUCTURE — Gerhard Herzberg (translated by J. W. T. Spinks) — *Prentice-Hall*, 257 p., \$4.25. This volume by the research professor of physics at the University of Saskatchewan is a translation of a previous volume published in German. It is adapted to the beginner in this field and also to those who require a certain knowledge of the subject because of its application in other fields.

Science News Letter, July 17, 1937

Mathematics

FIRST YEAR COLLEGE MATHEMATICS. Part II: Mathematical Analysis—Volney H. Wells—*Van Nostrand*, 276 p., \$2.75. By the associate professor of Mathematics in Williams College.

Science News Letter, July 17, 1937

Archaeology

CHAPTERS IN NEBRASKA ARCHAEOLOGY, Vol. 1, Nos. I-VI—Earl H. Bell—*Univ. of Nebraska*, 427 p., Cloth, \$3; Paper, \$2.50. Six technical papers.

Science News Letter, July 17, 1937

Language

SHOLL'S HUMANITOME — Clarence Vreeland Sholl—*Verbis Pub. Co.*, 414 p., \$5. A thesaurus of specialized and applied vocabularies for the use of writers, speakers and students.

Science News Letter, July 17, 1937

Medical Biography

RECOLLECTIONS OF MY LIFE—Santiago Ramon y Cajal; Trans. by E. Horne Craigie—*Amer. Philosophical Soc.*, 638 p. (2 vols.), \$5. Memoirs of the American Philosophical Society, Vol. VIII, Parts I and II. This is the autobiography of an eminent medical scientist who died only 5 years ago, and who has been called one of the greatest histologists of all time. His personal attributes were

apparently such as to make him an inspiring and enthusiastic teacher and much of his delightful personality appears in this book. Its interest is far from being limited to medical scientists. The author's non-scientific experiences and his shrewd observations on life and people make the book interesting to the lay reader, even if he must skip a few pages of scientific discussion here and there.

Science News Letter, July 17, 1937

Handicrafts

ART WEAVING—Frieda Kean—*Heath*, 105 p., illus., \$1.16. Providing a theoretical and cultural background for a practical course in hand-weaving, there are chapters on materials and techniques, art weaving materials, oriental rugs, tapestry, laces and colonial weaving.

Science News Letter, July 17, 1937

Anthropology

SNOWSHOES—Daniel Sutherland Davidson—*Univ. Pa. Press, for Amer. Philosophical Soc.*, 207 p., illus., \$2.50. A detailed, historical, geographical and anthropological investigation of snowshoes by the assistant professor of anthropology at the University of Pennsylvania. Memoirs of the American Philosophical Soc., Vol. VI.

Science News Letter, July 17, 1937

Ethnology

ROAD MY BODY GOES—Clifford Gessler—*John Day & Reynal*, 362 p., illus., \$3.50. A journal of observation and adventure in the Dangerous Islands by a newspaperman attached to an ethnological expedition of the Bernice P. Bishop Museum of Honolulu. It is an engaging account of primitive Polynesian life, and the experiences of a white man upon an "isle of peace."

Science News Letter, July 17, 1937

Aviation

AMERICAN AVIATION—Vol. 1, No. 1, June 1, 1937—*Pub. fortnightly*, 647 Earle Bldg., Washington, D. C. \$3. per year. A new aviation magazine edited by Wayne Parrish. Designed to give business executives the little-mentioned facts of the industry and to give the facts without fear of treading on anyone's toes.

Science News Letter, July 17, 1937

Physics

THE NEWER ALCHEMY—Lord Rutherford—*Cambridge (Macmillan)*, 67 p., illus., \$1.50. See page 40.

Science News Letter, July 17, 1937

Aeronautics—Biography

SKY STORMING YANKEE: THE STORY OF GLENN CURTISS—Clara Studer—*Stackpole*, 370 p., plates, \$3. The authorized biography of a great pioneer of American aviation.

Science News Letter, July 17, 1937

General Science

ESSENTIAL EXPERIMENTS IN GENERAL SCIENCE, PART I, 64 p., 50c, PART II, 64 p., 50c—Herschel N. Scott—*Beckley-Cardy*. For use with high school students, written by the Chairman, General Science Center, North Side High Schools, Chicago.

Science News Letter, July 17, 1937

Physiology

AUTONOMIC NEURO-EFFECTOR SYSTEMS—Walter B. Cannon and Arturo Rosenbluth—*Macmillan*, 229 p., illus., \$4. Too technical for lay reading, but physiologists and other medical scientists will find much of interest in this monograph which covers recent research in an important field.

Science News Letter, July 17, 1937

Medicine

MATERIA MEDICA, TOXICOLOGY AND PHARMACOGNOSY—William Mansfield—*Mosby*, 707 p., illus., \$6.75. A text for students of medicine, nursing and pharmacy and a reference book for physicians and pharmacists. The book covers the official drugs of the U. S. Pharmacopoeia XI and the National Formulary VI.

Science News Letter, July 17, 1937

Library Science

STATE AND REGIONAL PLANNING: AN ANALYSIS OF THE SUBJECT ARRANGED WITH PARTICULAR REFERENCE TO THE CLASSIFICATION OF LIBRARY MATERIAL, WITH ALPHABETIC SUBJECT INDEX — Arthur C. Comey and Katherine McNamara, in collaboration with Henry V. Hubbard and Howard K. Menhinick—*Harvard Univ.*, 22 p., 50c.

Science News Letter, July 17, 1937

Physics

ELEMENTARY COLLEGE PHYSICS, 447 p., \$3.50.; LABORATORY MANUAL FOR ELEMENTARY COLLEGE PHYSICS, 199 p., \$1.90 —Norman E. Gilbert and Leslie F. Murch—*Harcourt, Brace*. By two Dartmouth College professors.

Science News Letter, July 17, 1937

Psychology

YOGA, A SCIENTIFIC EVALUATION—Koor T. Behanan—*Macmillan*, 270 p., illus., \$2.50. See page 46.

Science News Letter, July 17, 1937